

## Certificate of Analysis

Date of Testing: 2022-11-22 16:14:27

Date of Next Testing: 2023-11-22 16:14:27

Product Name: **1-Methyl-2-pyrrolidinone**

CAS Number: 872-50-4

Specifications & Purity: electronic grade,99.9%

Lot #: K2217066

SKU #: **M103246**

**Analysis:** **151151**

Storage Temperature: Protected from light,Desiccated

| Parameter                               | Limit Values | Result    |
|-----------------------------------------|--------------|-----------|
| Water by Karl Fischer                   | 0-0.03 (%)   | 0.01 %    |
| Refractive index n <sub>20/D</sub>      | 1.468-1.472  | 1.47      |
| Hazen                                   | 0-25         | 24.00     |
| Sodium(Na)                              | 0-10 (ppb)   | 0.00 ppb  |
| Molybdenum(Mo)                          | 0-10 (ppb)   | 0.00 ppb  |
| Phosphate(PO <sub>4</sub> )             | 0-0.05 (ppm) | 0.00 ppm  |
| Iron(Fe)                                | 0-10 (ppb)   | 0.00 ppb  |
| Calcium(Ca)                             | 0-5 (ppm)    | 0.00 ppm  |
| total diol                              | 0-20 (ppm)   | 12.00 ppm |
| Cadmium(Cd)                             | 0-10 (ppb)   | 0.00 ppb  |
| Purity(GC)                              | 99.9-100 (%) | 99.95 %   |
| Lithium(Li)                             | 0-10 (ppb)   | 0.00 ppb  |
| Potassium(K)                            | 0-10 (ppb)   | 0.00 ppb  |
| Magnesium(Mg)                           | 0-10 (ppb)   | 0.00 ppb  |
| Sulfate(SO <sub>4</sub> <sup>2-</sup> ) | 0-0.05 (%)   | 0.00 %    |
| Zinc(Zn)                                | 0-10 (ppb)   | 0.00 ppb  |
| Nickel(Ni)                              | 0-10 (ppb)   | 0.00 ppb  |
| (NO <sub>3</sub> )Nitrate               | 0-0.05 (ppm) | 0.00 ppm  |
| Copper(Cu)                              | 0-10 (ppb)   | 0.00 ppb  |
| Cobalt(Co)                              | 0-10 (ppb)   | 0.00 ppb  |
| Aluminum(Al)                            | 0-10 (ppb)   | 0.00 ppb  |
| Manganese(Mn)                           | 0-10 (ppb)   | 0.00 ppb  |
| Chloride (Cl <sup>-</sup> )             | 0-0.05 (ppm) | 0.02 ppm  |
| Silver (Ag)                             | 0-10 (ppb)   | 0.00 ppb  |
| Total Amine                             | 0-20 (ppm)   | 11.00 ppm |
| Chromium(Cr)                            | 0-10 (ppb)   | 0.00 ppb  |

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| Parameter            | Limit Values                     | Result                           |
|----------------------|----------------------------------|----------------------------------|
| Lead(Pb)             | 0-10 (ppb)                       | 0.00 ppb                         |
| Appearance (M103246) | Colorless to light yellow liquid | Colorless to light yellow liquid |
| Infrared spectrum    | Conforms to Structure            | Conforms to Structure            |

A handwritten signature in black ink that reads "John Su".

John Su  
QA & QC Manager